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A-5:91-79(S) (SRD/CNWDI)
December 16, 1991

Potential NSNF Weapons Concepts for the 21st Century (U)

Perspectives, Warhead Technologies, and Delivery System Concepts

~~Redaction
Required
[SRD(N)]
UCNI~~

LOS ALAMOS



01878899

Briefing to Joint Defense Policy Board/Defense Science Board Task Force on
Non-Strategic Nuclear Forces

December 17-18, 1991

~~CRITICAL NUCLEAR WEAPON
DESIGN INFORMATION - DCD
DIRECTIVE 5210.2 APPLIES~~

~~THIS BRIEFING IS CLASSIFIED SECRET-RESTRICTED DATA-CNWDI~~

Sandia

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Los Alamos

DERIVATIVE CLASSIFIER

J. S. Howard

Name

Staff Member, A-5

Title & Organization

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DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW	
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AUTHORITY: EDC, MDD	
NAME: B. J. Howard	
AUTHOR: J. S. Howard	
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NSNF Briefing Overview

A-5:91-79(6) (SRD/enwdb)

December 16, 1991

Perspectives-

- Commitments to NATO
- Future 3d World Nuclear-Armed Adversaries
- Instability & Spillovers from Soviet Union Dissolution
- Deterrence & Insurance over Far-Term of 50+ Years

Warhead Technologies-

- Safety Enhancements
- Flexible and Modular Designs:
 - Fieldable Prototypes
- Low Yield Designs

Delivery System Concepts -

- Stealthy Stand Off Bomb
- Tactical Earth Penetrating Weapon
- Convertible Torpedo
- ASRAM
- Air-Launched Precision Strike Weapon

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A-5:91-79(9) (SRD/CNWDU)

December 16, 1991

Perspectives on NSNF - I

WHY: *Forward-Deployed Commitments to NATO*

- Preclude Proliferation via Extended Deterrence Guarantees and Programs of Cooperation
- Ensure Deterrence as Weapons of Last Resort
- Promote Stability with US Presence in Post-Cold War Europe

HOW:

100s of Air-Delivered Systems in Europe

TECHNOLOGIES:

B61 Stockpile Improvement Programs
New Delivery Concepts

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A-5:91-79(C) (SRD/CNWD)

December 16, 1991

Perspectives on NSNF - II

WHY: *Deterrence of Future 3d World Nuclear States*

- Provide Credible Regional Deterrence with Appropriate Options
- Preclude Sanctuary to Nuclear-Armed Leadership
- Protect Deployed US Forces

HOW:

CONUS Contingency Force of Low Yield Systems

TECHNOLOGIES:

**Very Low Yield Earth Penetrator Weapon
Low Yield Anti-Theater Ballistic Missile
Low Yield Air-Delivered Stand-off Missile**

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A-5:91-79(6) (SRB/CNWD)

December 16, 1991

Perspectives on NSNF - III

WHY: *Insurance to Counter Post-USSR NSNF*

- Counter Russian Civil War Spillovers and Loss of Central Nuclear Control
- Deter Resurgent Russian Imperialism Armed with Nuclear Weapons

HOW:

Air-Delivered Weapons in Europe

CONUS Air- & Sea-Launched Forces

TECHNOLOGIES

**Common Strategic & Non-Strategic
Stand-off Air Munition**

Maritime Bomb & ASW Options

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A-5:91-79(0) (CHD/CNWB)

December 16, 1991

Perspectives on NSNF - IV

WHY: *Stability, Insurance, Deterrence over the Far Term*

- Proliferation Control through Extended Non-Strategic Deterrence
- Balance "Pre-Strategic", "Sub-Strategic", and Tactical Weapons Possessed by Other Industrial Nations
- Guard against Technological Surprise in Unpredictable Future

HOW:

Limited Builds and Prototyping
Maintenance of Core Competence

TECHNOLOGIES
Supersafe Designs
Advanced Designs & Materials

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A-5:91-79(S) (SRD/CNIWDH)

December 16, 1991

Perspectives:

**The President's Initiatives will Change the Deterrent,
Challenge the Complex, and Demand a New Role
and Impact from RD&T**

- Stand-down of many alert forces
- Environmentally sound, low-cost destruction of many weapons, with few new builds
- Dramatic reductions in deployed US and Soviet weapons, plus increased concern for weapons and SNM in post-USSR and other countries
- Deterrence, role of nuclear weapons will evolve
 - Some current weapons will be adequate for the near-term, others will not, BUT

*Nuclear Deterrence Remains a Cornerstone of
National Security Policy*

**Nuclear Warhead Technologies will Remain an Important
Component of Evolving National Strategies**

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A-5:91-79(6) (SRD/CNWDH)

December 16, 1991

Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

Enhanced Surety in a Graded Approach: a Guiding Principle will be Stockpile Stability for 50+ Years

We Will Emphasize:

- A "Common Pit" for the B61 and W80 families providing IHE, fire resistance, pit reuse, and other features such as laser initiation
- Small Builds and Fieldable Prototypes
- Supersafe primary designs, e.g., a Pu-free primary for the ALCM/ACM, B61
- A new IHE (LAX-112) with energy density nearly equal to conventional high explosive
- Predictive capability for nuclear safety in abnormal environments

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December 16, 1991

Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

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Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

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December 16, 1991

Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

**MULTIPLE-APPLICATION SURETY TECHNOLOGY (MAST)
EXAMPLE: CONVERSION OF W91 TECHNOLOGY FOR MULTIUSE**

- * **Goal:** Sandia, Los Alamos, and the production agencies develop and prototype a warhead system and modern primary with enhanced surety features and ES&H compliant safing, arming and firing technologies for future SIPs and warhead development programs

- B61-3/4/10
- Stand-off Bomb
- Dual Capable Bomb
- Tactical Air-to-Surface Missile
- Minuteman III Missile
- HPRF

* **Major Tasks**

- Integrate System Requirements
- UGT Demonstration
- Establish Environmental Capability
- Produce Functional Proof-of-Concept Hardware
- Establish Production Processes

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December 16, 1991

Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

**MULTIPLE-APPLICATION SURETY TECHNOLOGY (MAST)
APPLICATIONS**

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A-5:91-79(6) (SRD/CNWDI)

December 16, 1991

Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

MULTIPLE-APPLICATION SURETY TECHNOLOGY (MAST) FEATURES

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A-5:91-79(e) (SRB/ENWB)

December 16, 1991

Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

Deterrence by Capability: Fieldable Prototypes and Small Builds – A new concept for consideration

Why?

- **Flexible response in a changing world**
 - Future builds will not be as large as before
 - Broader military requirements
- **DoD thinking provides the technological imperative**
 - How to maintain the defense industrial base
 - Change the culture from "big program" = success
 - R&D has big role in "deterrence by capability" and in reconstitution
- **Linkage with future of DOE Infrastructure**
 - Smaller, more flexible complex
 - Small builds and fieldable prototypes help maintain capability between larger production runs

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December 16, 1991

Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

Pu-Free Design Concept -- A Supersafe Initiative (U)

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A-5:91-79(6) (SRD/CNWD)

December 16, 1991

Warhead Technologies: Low Yield Designs

**Very-Low-Yield Nuclear Weapons could be very effective
and credible counters against future third world nuclear threats**

- 10-ton EPW
 - Hold buried C3 at risk
 - Neutralize MOBs by cratering runways
 - Collateral damage very localized
- 100-ton ATBM warhead
 - Destroy nuclear, biological, or chemical warheads in flight
- 1000-ton battlefield weapon
 - Deter use of mass destruction weapons by third world nations
 - Destroy company-sized units in overrun scenarios

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December 16, 1991

Warhead Technologies: Low Yield Designs

W86 PERSHING II EARTH PENETRATOR

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A-5:91-79(8) (SRD/CNWDI)

December 16, 1991

Warhead Technologies: Low Yield Designs

W33 AFAP Modified into a Tactical Low Yield Earth Penetrating Weapon

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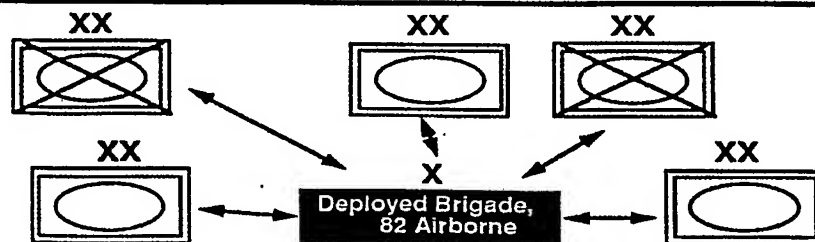
December 16, 1991

Warhead Technologies: Low-Yield Designs

**A Low Yield Air-Launched Weapon Could Provide
Capability to Prevent Overrun of Our Early Entry Forces**

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A-5:91-79(8) (SRD/CNWDH)

December 16, 1991

Hundreds of NSNFs Should Be Maintained and Modernized Within New US National Strategies

As the US Downsizes its Military and Nuclear Warhead Stockpiles, a Nuclear Force Other Than Strategic Weapons Is Needed –

- For NATO forward-deployment**
- To deter future nuclear-armed third world adversaries**
- To guard against Russian instabilities, and post-USSR relapses and regional spillovers**
- For far-term deterrence & insurance**

The Nuclear Weapons Laboratories Must Maintain a Broad Level of Competence to Support Future NSNF Needs

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Laboratory/DOE Briefing on December 17, 1991, to Joint DPB/DSB Task Force on Non-Strategic Nuclear Forces

Attending Members of Task Force

GEN John W. Vessey, USA, Ret (Former CJCS)

Dr. Joseph V. Braddock (BDM Intl)

GEN Andrew J. Goodpaster, USA, Ret (Former USAREUR CDR)

ADM Huntington Hardisty, USN, Ret

Dr. Charles A. McDonald

GEN Donn Starry, USA, Ret

Ambassador Seymour Weiss

Other Task Force Members: Dr Harold Agnew, Prof Graham Allison, GEN James Dalton USAF Ret, GEN Russel Dougherty USAF Ret, Dr Albert Narath, Dr James Roche

Government Task Force Representatives

Dr. Robert Barker (OATSD-AE)

Dr. Everett Beckner (DOE)

Mr. William Kahn (OSD/TNF)

MGEN Gerald G. Watson (CDR DNA)

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DOE OFFICE OF *Classification*

B. J. Hinkle DO, DATE: *7/2/09*

23 pp.

PURPOSE: To brief DOE Laboratories Warhead & Delivery System Technologies for Task Force consideration and use to Secretary Cheney. Expanded to include Perspectives on NSNF Roles.

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NUCLEAR INFORMATION

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Laboratories Personnel at Briefing

Los Alamos: Tom Seitz, Frank Smith, Joe Howard

Sandia Albuquerque: Jack Werth, John Anderson

Lawrence Livermore: Kent Johnson

DOE Headquarters: Ev Beckner

Two Hour Briefing:

1. Los Alamos: Introduction, NSNF Roles, Nuclear Warhead Technologies (Common Pit, Multiple-Application Surety Technology, Fieldable Prototypes, Supersafe Designs, Low Yield Designs-- EPW, Battlefield Deterrence)

2. Livermore: NSNF Nuclear Warhead Applications & Effects (EMP, TBMD, Low Yield EPW)

3. Sandia: NSNF Delivery System Concepts (Stealthy Stand-off Bomb, Tactical EPW, Convertible Torpedo, ASRAM, Air-Launched Precision Strike Weapon), Summary

4. DOE: Future Production Complex

Back-Channel Responses

December 17 Laboratories Briefing:

- Excellent, Superb
- Viewgraphs wanted by Task Force

December 19 Task Force with SecDef Chen^ey:

- Unusual two-hour session, very well-received
- Used Laboratory VGs
- SecDef remains committed to an NSNF capability
- Task Force to prepare report and remain as body for further work

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Potential NSNF Weapons Concepts for the 21st Century (U)

**Perspectives, Warhead Technologies, and
Delivery System Concepts**

Briefing to Joint Defense Policy Board/Defense Science Board Task Force on
Non-Strategic Nuclear Forces
December 17-18, 1991

**UNCLASSIFIED & SANITIZED VIEWGRAPHS FROM
SECRET-RESTRICTED DATA-CNWDI BRIEFING**

Sandia

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Los Alamos

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CONUS Air- & Sea-Launched Forces

TECHNOLOGIES

**Common Strategic & Non-Strategic
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Maritime Bomb & ASW Options

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Supersafe Designs
Advanced Designs & Materials

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Enhanced Surety in a Graded Approach: a Guiding Principle will be Stockpile Stability for 50+ Years

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Nuclear Information

Reviewed by: *Daniel Gorth* LANL CO 4/6/09
Official: (Signature) (Date)

Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

STRATEGIC PIT RECOVERY

Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

PIT REUSE

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Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

MULTIPLE-APPLICATION SURETY TECHNOLOGY (MAST)
EXAMPLE: CONVERSION OF W91 TECHNOLOGY FOR MULTIUSE

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*** Major Tasks**

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Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

**MULTIPLE-APPLICATION SURETY TECHNOLOGY (MAST)
APPLICATIONS**

Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

**MULTIPLE-APPLICATION SURETY TECHNOLOGY (MAST)
FEATURES**

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Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

Deterrence by Capability: Fieldable Prototypes and Small Builds – A new concept for consideration

Why?

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Warhead Technologies: Low Yield Designs

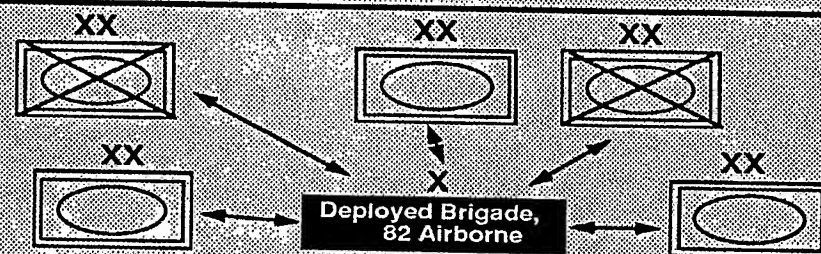
W86 PERSHING II EARTH PENETRATOR

Warhead Technologies: Low Yield Designs

Tactical Low Yield Earth Penetrating Weapon

Warhead Technologies: Low-Yield Designs

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